

Design and Prototypical Implementation of an Intelligent Multi-Agent System Based on Distributed Ledger in a Healthcare Ecosystem

Master Thesis, Patrick Frey

The need for trusted ecosystems between healthcare organizations is essential. An intelligent multi-agent system for such ecosystems must contain trust, which cannot be achieved by a centralized decision-maker. With a combination of distributed ledgers and multi-agent systems, trust in a central decision maker will no longer be necessary. The objective of this thesis is to design and implement a prototype of an intelligent multi-agent system based on a distributed ledger technology in a healthcare ecosystem. We answer the research question "*How can distributed ledger technology support intelligent multi-agent systems to ensure trust in healthcare ecosystems?*" We apply design science research methodology [2]. To define rigor and relevance, we conduct a systematic literature review [1, 4] and semi-structured interviews with experts from the field [3]. We contribute to the scientific literature by providing an understanding of how multi-agent systems and distributed ledger technology can be combined to establish trust in the healthcare ecosystems.

[1] vom Brocke, J., A. Simons, B. Niehaves, et al., "Reconstructing the Giant: On the Importance of Rigour in Documenting the Literature Search Process", *17th European Conference on Information Systems 9*, 2009, pp. 2206–2217.

[2] Peffers, K., T. Tuunanen, M.A. Rothenberger, and S. Chatterjee, "A Design Science Research Methodology for Information Systems Research", *Journal of Management Information Systems 24*(3), 2007, pp. 45–77.

[3] Recker, J., *Scientific research in information systems: a beginner's guide*, 2013.

[4] Webster, J., and R.T. Watson, "Analyzing the Past to Prepare for the Future: Writing a Literature Review.", *MIS Quarterly 26*(2), 2002, pp. xiii–xxiii.